Citation:

Pittaway JK, Ahuja KD, Cehun M, Chronopoulos A, Robertson IK, Nestel PJ, Ball MJ. Dietary supplementation with chickpeas for at least 5 weeks results in small but significant reductions in serum total and low-density lipoprotein cholesterols in adult women and men. Ann Nutr Metab. 2006;50(6):512-8. Epub 2006 Dec 21. PMID: 17191025

Study Design:

Randomized, crossover intervention trial

Class:

A - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To compare the effects of a chick-pea-supplemented diet and those of a wheat-supplemented diet on human serum lipids and lipoproteins.

Inclusion Criteria:

Aged 30-70 yoa; not taking cholesterol-lowering medications; informed consent.

Exclusion Criteria:

none mentioned.

Description of Study Protocol:

Recruitment not mentioned.

Design

randomized crossover design with 2 intervention periods.

Blinding used (if applicable): Not mentioned.

Intervention (if applicable)

5-week interventions separated by 8-week washout period: chickpea-supplemented diet and a wheat-supplemented diet

- Chickpea diet: daily consumption of 140 g canned drained chickpeas, chickpea bread, chickpea shortbread biscuits (all provided to subjects; chickpeas = 300 g net wt; 3.4 Mj/d; 16% protein, 19% fat; 65% CHO; 27 g fiber)
- Wheat diet: wholemeal (wheat) bread, high-fiber (wheat) breakfast cereals (>2.5 g fiber/100

g); shortbread biscuits (not provided to subjects)

Statistical Analysis

- Repeated-measures ANOVA by GLM to compare ingestion of nutrients during chickpea and wheat diets and to determine effects of diets on serum lipids and lipoproteins.
- Univariate and multivariate analyses to assess associations between dietary intakes and lipid profiles.
- All adjusted for order of interventions and blood sample collection.

Data Collection Summary:

Timing of Measurements

Pre-intervention: 4-d weighed diet records to calculate usual EI

Last week of each intervention, another 4-d food record.

Fasting blood samples collected at the start and end of 2 dietary periods

Dependent Variables

- Lipids (autoanalyzers)
- LDL-C (Friedwald equation)

Independent Variables

- Dietary intake (4-d records; FoodWorks software)

Control Variables

Asked subjects to maintain physical activity, body weight; limit alcohol to 2 drinks/d; keep F/V and fat intake consistent with pre-intervention.

Description of Actual Data Sample:

Initial N: N=52 M and F

Attrition (final N): N=47; 28 F, 19 M

Age: 53±9.8 yoa

Ethnicity: not mentioned.

Other relevant demographics: none mentioned.

Anthropometrics: 79.3±16.3 kg; 27.6±41 kg/m^2 (NS between start and end of each diet period, or end of the 2 interventions); NS differences for lipid profiles at start of each period.

Location: Launceston and Melbourne, Australia

Summary of Results:

NS differences in total EI between interventions; small but significantly lower protein intake and MUFA intake in Chickpea intervention compared to wheat (P<0.001). CHO intake sig higher (P=0.02) on chickpea compared to wheat.

Serum total-C was 3.9% lower (P=0.001) and LDL-C was 4.6% lower (P=0.002) at end of chickpea vs wheat diet. Serum HDL-C and TAG ns different between interventions.

Substantial effect of chickpea on whole serum total-C (P=0.001) and LDL-C (P=0.002) compared to wheat diet.

Dietary fiber showed strongest association, with a reduction in serum total-C of 0.24 mmol/l (P=0.03) and in serum LDL-C of 0.21 mmol/l (P=0.04) for each increase in SD in fiber intake. 55% of difference in serum total-C and LDL-C attributed to combined effect of fiber and PUFA in chickpea diet.

Author Conclusion:

Chickpeas may have a role in reducing coronary heart disease risk by 13.5% through dietary intervention with fiber intake of ~30 g/d.

Reviewer Comments:

- *Wheat and chickpea comparison - chickpeas may have benefits beyond fiber (i.e. PUFA);*
- *Small sample size; conducted in 2 different centers (may be inherent differences in those 2 populations that may reduce effect).*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions		
1.	**Was the research question clearly stated?**	Yes

1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes

4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	Yes
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	No
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	No
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	Yes
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes

7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	No
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes